

**FURMAN**  
PURIFY YOUR POWER

The

# IT-20 II

Balanced Power Conditioner



### **FEATURES**

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- Ultra-low noise balanced isolation transformer provides over 80 dB of common noise reduction from 20Hz - 20kHz, assuring the lowest noise floor possible for today's sensitive recording equipment
- Toroidal transformer assures contained magnetic field, allowing any component to operate in close proximity without inducing noise
- GFCI protected outlets with Ground Lift switch to eliminate AC hum and ground induced noise
- Furman's Linear Filtering Technology (LiFT) provides well over 40 dB of differential mode noise reduction from 100kHz-1Ghz for unequalled audio clarity
- Series Multi-Stage Protection Plus (SMP+) for virtually maintenance-free protection from surges and spikes. No sacrificed parts, no service calls, no downtime!
- Automatic Extreme Voltage Shutdown (E.V.S.) will power down equipment during a prolonged and / or extreme over-voltage situation
- 20 amp capacity with 12 ultra-low resistance isolated-ground Hubbel AC outlets, plus two front panel convenience outlets

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## INTRODUCTION

Thank you for your purchase of a Furman IT-20 II 20 amp Balanced Power Conditioner, and congratulations on your choice. This specially wound and shielded toroidal isolation transformer is designed specifically to reduce hum pickup by sensitive equipment when ultra-low-noise is a must.

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## DESCRIPTION

Designed for the most critical, ultra-low noise installations, the IT-20 II can supply 20 amps of Balanced AC power for recording studios, broadcast stations, or video production facilities. To understand the incredible need for clean noise-free AC power, it's important to note that today's sophisticated studio equipment features tremendous dynamic range. Most of the signal content that defines high resolution such as harmonics, instrument timbre, high frequency extension, spatial cues, and fast transient attacks in audio are inherently low in signal level. Further, when AC noise is induced into audio processors, pre-amplifiers, microphones, powered monitors, computers, and mixing consoles, the all important low level signals are distorted or masked. Once signals are masked there is no way to retrieve the lost content. Advanced AC filtering is critical when audio or video resolution is at stake. With Furman's IT-20 II, for the first time you will hear audio content and see video images as they were meant to be - pristine. Add to this our SMP+ non-sacrificial surge suppression, E.V.S. protection, Linear Filtering Technology (LiFT), and laboratory grade digital voltmeter and you will be assured that AC noise and surges are a thing of the past.

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## INSTALLATION

The power source to which the IT-20 II is connected must be adequate for use at 20 amps. We recommend a 30 amp circuit, wired with 10 gauge wiring, if continuous operation near 20 amps is anticipated. A dedicated (nothing else connected) 20 amp circuit is the minimum acceptable to comply with NEC requirements. Consult a qualified electrician if in doubt. The IT-20 II is designed for mounting in a standard 19 inch equipment rack. Because of its weight, the best position for it is the bottom slot of the rack. Its toroidal transformer minimizes magnetic leakage, but nevertheless, due to its high capacity, it will radiate an appreciable magnetic field. Therefore, we recommend that it not be positioned adjacent to sensitive, low level signal processors, especially mic preamps, mixers, tape recorders, etc. Power amps may be more suitable "rack neighbors."

The maximum benefit is derived from balanced power when it powers ALL equipment in an installation. Therefore, try to position the IT-20 II in a central location so its power can be easily distributed everywhere it's needed. If the total power consumption of all equipment exceeds 20 amps at 120 volts, delete high level or mechanical devices first (such as power amps, motors). If possible, physically isolate any equipment that has to be powered with conventional power through a different circuit, and route their AC cords away from all other cabling. The balanced power produced by the IT-20 II is restricted to use with electronic equipment only. Balanced power may not be used for lighting equipment, and access must be limited to use by qualified personnel only.

If you are installing the IT-20 II in a rack that has rear as well as front mounting rails, you may wish to order adjustable rear rack ears from Furman. These allow the IT-20 II to be securely attached in both the front and back. Order model RRM-2.

## **OPERATION**

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### **CIRCUIT BREAKER/SWITCH**

The IT-20 II has a large black switch on the front panel that is both a precision circuit breaker and an on-off switch. If circuit breaker is tripped, manually reset the unit by turning it off and then back on, to restore power.

### **GROUND FAULT INTERRUPTER (GFCI):**

The GFCI on the IT-20 II's front panel is a special kind of circuit breaker that detects an imbalance in the current flowing in the two hot legs. The "missing" current is presumed to be flowing through the ground conductor (the round pin on an AC outlet).

Ground current often indicates a dangerous partial or full short circuit. If an imbalance is detected, the GFCI trips and cuts off power not only to itself, but to all the IT-20 II's outlets. If this occurs, the button on the GFCI marked "R" (Reset) will pop out. To restore operation, correct the fault and push the button in. You may test the proper operation of the GFCI at any time by simulating a ground fault by pushing the button marked "T" (Test). If the GFCI is working properly, this will cause the "R" button to pop out and cut off power. You can restore operation after a test by pushing the "R" button in.

### **GROUND LIFT SWITCH**

Ground loops are fairly common in many installations because AC cords with safety ground are rarely connected to a single low-resistance buss bar. When there is a significant difference in voltage between a source component's neutral and ground and a load component's neutral and ground, the buzz and hum associated with this type of ground current noise (or loop) may take place. Additionally,

many AC noise contaminants may be present on the AC ground wire. For these reasons Furman's IT-20 II contains a Ground Lift Switch.

This switch floats the output ground, eliminating ground noise and also, in many instances, the hum and buzz associated with ground loops. The IT-20 II's GFCI protection circuit assures that even when utilizing the power conditioner in this mode, operation is safe and secure. In fact, even if a connected component has a catastrophic failure, less than 5 milliamps current imbalance from line to ground or neutral to ground will instantly disconnect the voltage output from the IT-20 II. This is far safer than any conventional 120 VAC outlet, and it has numerous noise reducing advantages.

However, ground wiring in any studio, broadcast or club environment can be complex. Because all 14 outlets of the IT-20 II are in parallel, it is still possible to have a ground loop if the two offending products are simultaneously connected to a single IT-20 II. Use of multiple IT-20 II's may be necessary in extreme cases. Also, for studio and broadcast use, separating all digital processing products from all analog devices is highly recommended and can be accomplished by using two IT-20 II's.

In the end, it is best to experiment with this switch. Whichever position yields the least noise or clearest audio / video recording or reproduction is the position that should be utilized.

## **BALANCED AC POWER**

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In much the same way that balanced audio lines can reduce the pickup of hum and other types of electromagnetic interference (EMI), the use of balanced AC power lines in sensitive audio, video, or computer installations can make an enormous difference in system noise and signal integrity. But power distribution in North America, unfortunately, is not balanced. The distribution standards currently in use were derived from

practices established over a century ago, when electric power use was limited to lighting and motors, long before any AC noise sensitive applications existed. The emphasis then was on convenience (from the power utilities' standpoint) and safety, but not noise cancellation. The result was a three-wire distribution scheme in which 120V branch circuits have a hot wire and a neutral wire, with the neutral tied to a third wire connected for safety to an earth ground. The third wire does not carry any current unless there is a fault. This unbalanced scheme can create hum in audio circuits for two main reasons. First, the current flowing in the hot wire induces hum in any other nearby wires, which may carry vulnerable low-level audio or video signals. Second, because the impedance of chassis and cable shielding to ground is always greater than zero ohms, ground current flowing from power supply capacitors and from EMI pickup causes a voltage drop at 60Hz and its harmonics. This low level noise becomes part of the audio signals.

With a center-tapped isolation transformer, the AC power feeding a studio can be balanced at its source. The current-carrying wires then are no longer "hot" (120V) and "neutral" (0V), but two 60V lines of opposite polarity (referenced to ground connected to the center tap), whose difference is 120V. This type of power, when run around a room, does not induce hum into nearby audio wiring because the two conductors induce equal and opposite voltages that cancel each other. Similarly, ground currents are all but eliminated by the same common-mode cancellation effect. No longer is it necessary to adopt cumbersome and expensive star-ground systems or use massive bus bars or heavy ground rods. Further, with features such as our center tap ground lift, ground induced noise may be reduced even further.

Of course Balanced AC Power is only the beginning of a system free of AC noise.

Asymmetrical noise, or what is called "differential mode," is responsible for well over half the noise present in today's AC lines. For this reason we employ our exclusive Linear Filtering Technology (LiFT). This assures that your audio, video, or computer signals are as pure and uncorrupted as possible.

### **LINEAR FILTERING TECHNOLOGY (LiFT)**

Unfortunately, traditional AC filter conditioners have been designed for unrealistic laboratory conditions. Prior technologies could actually harm audio and video performance more than they help, due to the resonant peaking of their antiquated, non-linear designs. Under certain conditions, these designs can actually add more than 10 dB of noise to the incoming AC line! Worse still, lost digital data, the need to re-boot digital pre-sets, or destroyed digital converters are frequently caused by excessive voltage spikes and AC noise contaminating the equipment ground. Furman's LiFT takes another approach, ensuring optimal performance through linear filtering and no leakage to ground.

### **SERIES MULTI-STAGE PROTECTION PLUS (SMP+)**

Traditional surge suppression relies on circuits that "sacrifice" themselves when exposed to multiple transient voltage spikes, requiring the dismantling of your system and repair of your surge suppressor. With Furman's SMP+, however, damaging transient voltages are safely absorbed, clamped and dissipated. No sacrificed parts, no service calls, no downtime. Also unique to Furman's SMP+ is its unparalleled clamping voltage. While other designs offer clamping voltages that are well above 300Vpk, Furman's SMP+ clamps at 188Vpk, 133 VAC RMS, even when tested with multiple 6000Vpk, 3000 amp surges! This unprecedented level of

protection is only available with Furman's SMP+ technology.

### **EXTREME VOLTAGE SHUTDOWN (E.V.S.)**

When voltage rises to extreme levels because of a lost neutral line or an accidental connection to 208 or 240 VAC, Furman's Extreme Voltage Shutdown kicks in, automatically powering down all equipment quickly and safely to prevent damage from occurring. An indicator LED will then illuminate, alerting you to the situation until the over voltage condition is corrected by turning the unit off and then back on.

### **DIGITAL VOLTMETER:**

This LED digital voltmeter is an accurate, self-checking AC voltmeter that continually measures the IT-20 II's input AC voltage.

## **SAFETY INFORMATION AND WARNINGS**

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Please read and observe all of the safety and operating instructions before the IT-20 II is operated. Retain these instructions for future reference.

- Do not disassemble or modify in any way. No user-serviceable parts inside
- Keep away from moisture and avoid excessive humidity
- Do not allow liquids or foreign objects to enter the unit. Household lighting equipment may not be connected to the IT-20 II because its sockets are not designed for use with symmetrical power and may present a shock hazard. We recommend that only audio, video and computer processing equipment be connected to the IT-20 II

The IT-20 II should be serviced by qualified service personnel when:

- The power supply cord or plug has been frayed or cut
- Objects have fallen or liquid has spilled into the unit
- The IT-20 II has been exposed to rain or other moisture
- The IT-20 II does not appear to operate normally, or exhibits a marked change in performance
- The IT-20 II has been dropped, or the enclosure damaged

The IT-20 II requires that a safety ground be present for proper operation. Any attempt to operate the IT-20 II without a safety ground is considered improper operation and will invalidate the warranty.

### **POWER SOURCE**

The power source to which the IT-20 II is connected should be adequate for use at 7 amps. Typical household outlets will have a current capacity of at least 10 - 15 amps.

## **WARRANTY**

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*Furman Sound, LLC., having its principal place of business at 1690 Corporate Circle, Petaluma, CA 94954 ("Manufacturer") warrants its IT-20 II (the "Product") as follows:*

*Manufacturer warrants to the original Purchaser of the Product that the Product sold hereunder will be free from defects in material and workmanship for a period of three years from the date of purchase. The Purchaser of the product is allowed fifteen days from the date of purchase to complete warranty registration by mail or on-line at the Furman website. If the Product does not conform to this Limited Warranty during the warranty period (as herein above specified), Purchaser shall notify Manufacturer in writing of*



*the claimed defects. If the defects are of such type and nature as to be covered by this warranty, Manufacturer shall authorize Purchaser to return the Product to the Furman factory or to an authorized Furman repair location. Warranty claims should be accompanied by a copy of the original purchase invoice showing the purchase date; this is not necessary if the Warranty Registration was completed either via the mailed in warranty card or on-line website registration. Shipping charges to the Furman factory or to an authorized repair location must be prepaid by the Purchaser of the product. Manufacturer shall, at its own expense, furnish a replacement Product or, at Manufacturer's option, repair the defective Product. Return shipping charges back to Purchaser will be paid by Manufacturer.*

*THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Manufacturer does not warrant against damages or defects arising out of improper or abnormal use of handling of the Product; against defects or damages arising from improper installation, against defects in products or components not manufactured by Manufacturer, or against damages resulting from such non-Manufacturer made products or components. This warranty shall be cancelable by Manufacturer at its sole discretion if the product is modified in any way without written authorization from Furman Sound. This warranty also does not apply to Products upon which repairs have been affected or attempted by persons other than pursuant to written authorization by Manufacturer.*

*THIS WARRANTY IS EXCLUSIVE. The sole and exclusive obligation of Manufacturer shall be to repair or replace the defective Product in the manner and for the period provided above. Manufacturer shall not have any other obligation*

*with respect to the Products or any part thereof, whether based on contract, tort, strict liability or otherwise. Under no circumstances, whether based on this Limited Warranty or otherwise, shall Manufacturer be liable for incidental, special, or consequential damages. Manufacturer's employees or representatives' ORAL OR OTHER WRITTEN STATEMENTS DO NOT CONSTITUTE WARRANTIES, shall not be relied upon by Purchaser, and are not a part of the contract for sale or this limited warranty. This Limited Warranty states the entire obligation of Manufacturer with respect to the Product. If any part of this Limited Warranty is determined to be void or illegal, the remainder shall remain in full force and effect.*

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### SERVICE

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Before returning any equipment for repair, please be sure that it is adequately packed and cushioned against damage in shipment, and that it is insured. We suggest that you save the original packaging and use it to ship the product for servicing. Also, please enclose a note giving your name, address, phone number and a description of the problem.

*NOTE: All equipment being returned for repair must have a Return Authorization (R/A) number. To get an R/A number, please call the Furman Service Department at 707.763.1010 extensions 113 and 133. Please display your R/A number prominently on the front of all packages.*

# SPECIFICATIONS

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**AC Current Output:**

20 Amps (2400 watts at 60/120V)

**Shutdown Voltage:**

At 135-140 VAC

**Inlets:**

Heavy duty power cord with 20A three-pronged plug

**Outlets:**

12 rear (isolated), 2 front (GFCI) each rated at 20 amps

**Spike Protection Modes:**

Line to neutral, zero ground leakage

**Spike Clamping Voltage:**

188 Vpk @ 3,000 amps, 133 VAC RMS

(Tested to UL-1449 6,000 Vpk @ 3,000 amps)

**Response Time:**

1 nanosecond

**Maximum Surge Current:**

6,500 amps

**Differential Noise Attenuation:**

10dB @ 10kHz

40 dB @ 100 kHz

100 dB @ 10 MHz

**Common Noise Attenuation:**

Greater than 80 dB @ 20Hz to 20 KHz

Greater than 40 dB @ 20Khz to MHz

Linear attenuation curve from 0.05-100 ohms line impedance

**Turns Ratio:**

1:1, windings separated with Faraday Shield

**Transformer Regulation:**

3% at full load

**Power Consumption:**

12 watts for display and control circuits

**Voltmeter Accuracy:**

± 1V

**Dimensions:**

19" W x 5.25" H x 17" D, 80 lbs.

## ***FURMAN***

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